

## Statistics Level 2

Party, Party, Party

[http://www.nzmaths.co.nz/resource/party-party-party?parent\\_node=](http://www.nzmaths.co.nz/resource/party-party-party?parent_node=)

# Party, Party, Party

Purpose:

In this unit we conduct a number of investigations using a party theme. In the unit the students spend time counting, comparing, organising, analysing, displaying and interpreting data. While discussing the data we take the opportunity to use and reinforce early additive strategies for combining numbers.

Achievement Objectives:

Achievement Objective: [Conduct investigations using the statistical enquiry cycle: posing and answering questions; gathering, sorting, and displaying category and whole-number data; communicating findings based on the data.](#)

Achievement Objective: [Use simple additive strategies with whole numbers and fractions.](#)

Specific Learning Outcomes:

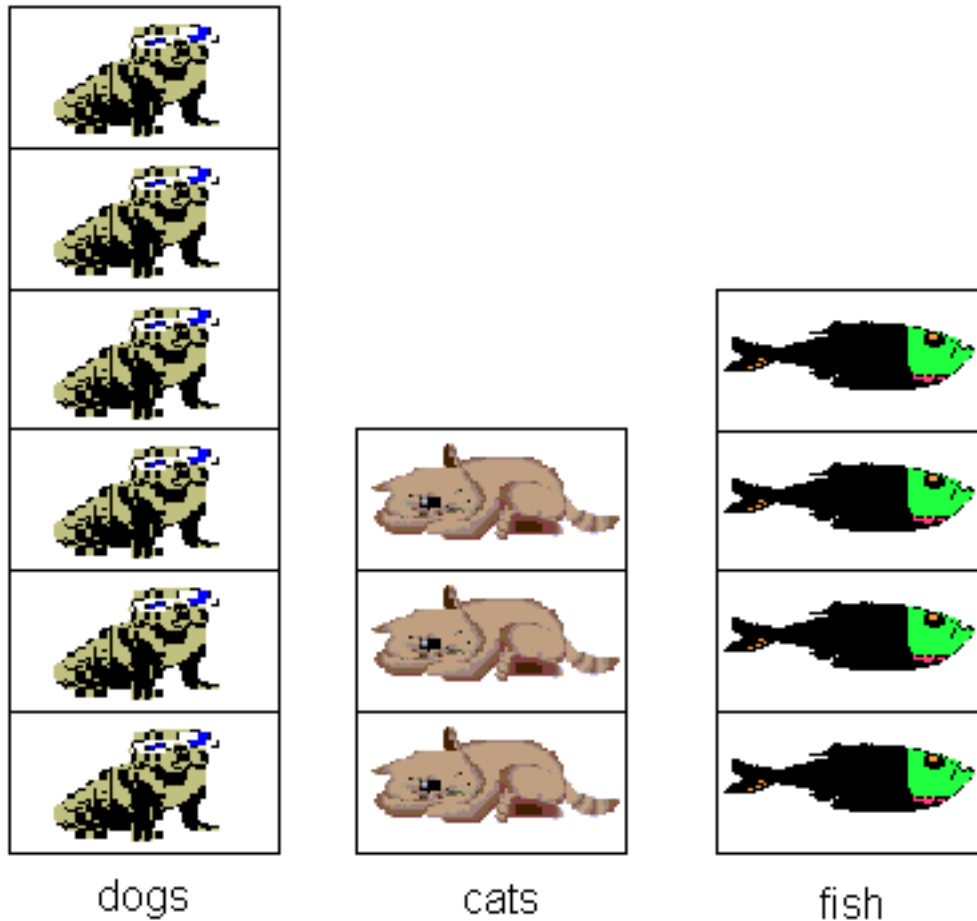
- pose questions for investigation
- collect category data
- display data in tally charts, uniform pictograms & bar charts
- make statements about data displays

Description of mathematics:

At Level 2 you can expect the students to be posing a greater range of questions. They will also be helped to understand some of the issues involved in conducting surveys and learn new methods for collecting data. While at Level 1 the students collected data and chose their own ways to display their findings, at Level 2 they will be introduced to uniform pictograms, tally charts and bar charts. More emphasis here will also be placed on the discussion of the data and the making of sensible statements from both the student's own displays and the displays of others.

Uniform Pictograph

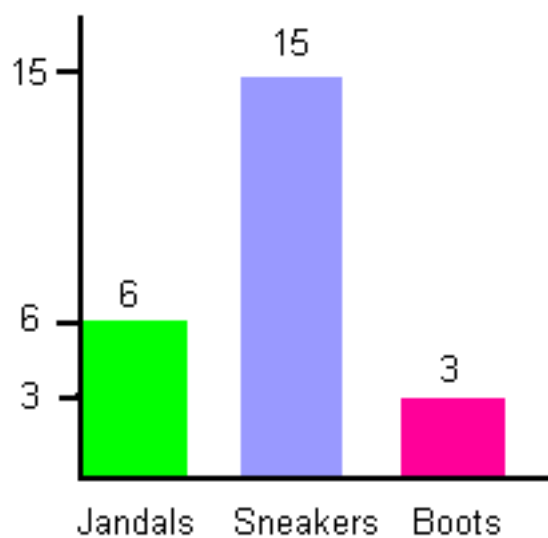
In a uniform pictograph the pictures are drawn on uniform pieces of paper. This means that the number of objects in each category now bears a direct relationship to the "size" of each category on the display. An example is shown in the diagram below.



In a further development the pictures can be displayed on a chart with axes and titles. The vertical axis can be numbered to match the pictures.

### Bar Chart

In a bar chart the pictures are replaced with vertical straight lines or rectangles. The position of these rectangles indicates what they represent and the height of these rectangles tells how many of that object there are.



The example above shows the types of shoes worn in the class on a particular day. There are three types of shoes: jandals, sneakers, and boots. The height of the corresponding rectangles shows that there are 6 lots of jandals, 15 lots of sneakers and 3 boots.

### Tally Chart

A tally chart provides a quick method of recording data as events happen. So if the students are counting different coloured cars as they pass the school, a tally chart would be an appropriate means of recording the data. Note that it is usual to put down vertical strokes until there are four. Then the fifth stroke is drawn across the previous four. This process is continued until all the required data has been collected. The advantage of this method of tallying is that it enables the number of objects to be counted quickly and easily at the end.

Red cars	Yellow cars	White Cars	Black Cars	Other Colours

In the example above, in the time that we were recording cars, there were 11 red cars, 4 yellow cars, 18 white cars and 5 black ones and 22 cars of other colours. Number Framework Stage 5, Early Additive At this stage students have begun to recognise that numbers are abstract units that can be treated simultaneously as wholes or can be partitioned and recombined. A characteristic of this stage is the derivation of results from known facts such as finding addition answers by using 'doubles' or 'ten facts'.

### Required Resource Materials:

Scrap paper (for recording tally marks)

Prepared bar graph outlines

Multi packs of chips

Party props: hats, candles, cards, sweets, blind fold

Sheets of A4 cut into eighths

Packet of balloons

Activity:

### Session 1: Balloons

Today we make a pictograph about our favourite balloon shapes.

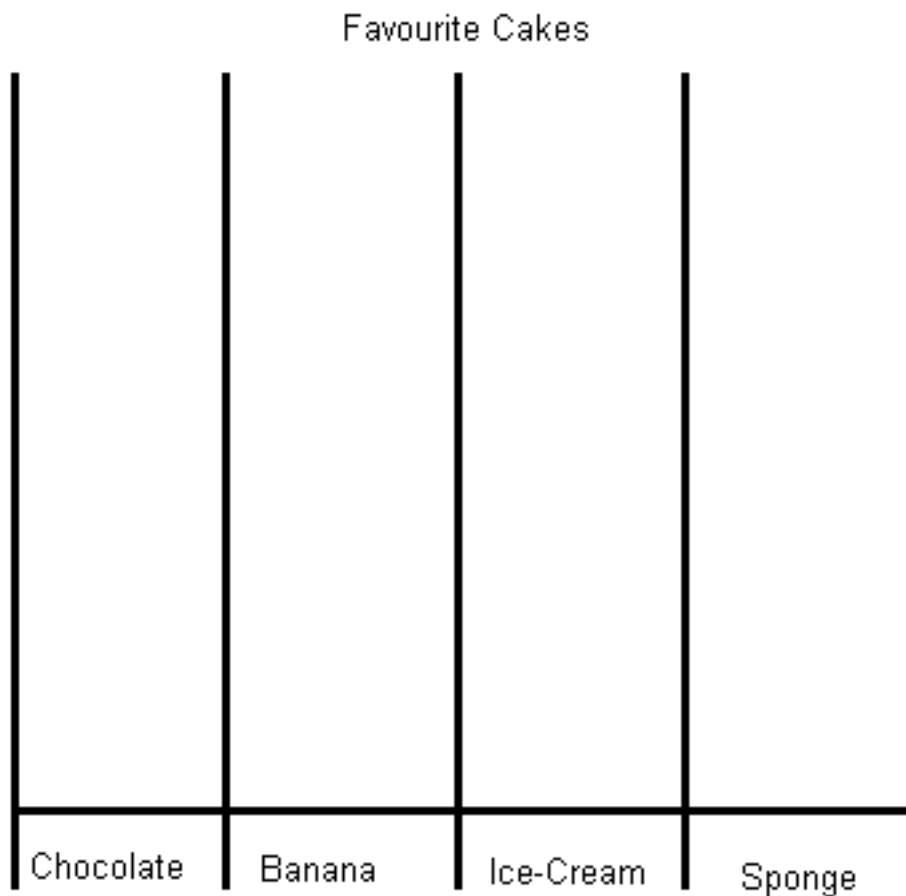
1. Take a bag of balloons and spread out. Discuss shapes. Students choose favourite shape (or colour if different shaped balloons are not available) and draw it on a piece of paper (one eighth of an A4).
2. Whole class discuss ways to display the data. If matching pictures in 1:1 lines (Pictogram) is not suggested, teacher will need to direct them to this.
3. Students attach their drawing to the class chart.
4. Discuss information shown on pictogram. These could be recorded as "speech" bubbles around the chart.
5. Talk about the need to label the axes and give the chart a title so that others could make sense of the display.
6. Ask questions about the results that require students to combine sets:  
*How many students liked long wiggly balloons?*  
*How many students liked long straight balloons?*

*How many students liked long balloons **altogether**?*  
*How can you add the numbers together?*  
*How many students liked balloons that were not long?*  
*How many **more** students liked long wiggly balloons than long straight balloons?* (Model and reinforce the use of subtraction or addition rather than counting on or back to solve this type of question.)  
Try to find questions that will allow students to use strategies such as near doubles and adding to make 10s.

## **Session 2: Party Questions**

1. Students brainstorm "how many" type questions around the party focus. For example:
  - *Which is your favourite birthday cake?*
  - *What is your favourite birthday game?*
  - *How many birthdays have you been to this year?*
  - *Where do you like to have your birthday?*
  - *What would you like to be given for your birthday?*
  - *What types of party food do you like?*
  - *How many people do you like to have at your birthday?*
2. Each group selects one of the questions and is given a partially prepared piece of chart paper.


3. The group need to record on the chart paper the title and the choices.



4. The students enter their data on their own chart using either sticky labels or prepared rectangles of paper which are glued onto the chart to form a pictograph.
5. When each group has completed recording their data they move to another group's "graph" and record the relevant data. Repeat as time allows.
6. Teacher roams questioning for understanding and ensuring that the students are able to correctly construct a pictogram.
7. Groups return to their original question to examine and discuss findings.
8. Share as a class.
9. Again, emphasise questions that require students to operate with the numbers in their display. Rather than asking *How many students...* ask *How many students liked cakes that were not Chocolate cake?*

### Session 3: Chips

Today we use tally marks to record the number of chips in a snack bag.

1. Display a snack bag of chips and ask the students to guess how many chips they think are in the bag.
2. Teacher models using tally marks to track how many chips she/he eats.
3. Distribute individual bags of chips.

4. Students eat chips and use tally marks to record the number of chips in each bag by adding the total of the tally marks each student in the group recorded.
5. Share the tallies.
6. Using a prepared bar graph outline the teacher constructs a bar graph with the information from the individual tallies.
7. Discuss features of the graph and summarise the information shown.  
*What was the most common number of chips?*  
*What was the least common number of chips?*  
*How many more chips were there in the packet with the most than there were in the one with the least?*
8. As a class challenge, try to work out how many chips the class ate altogether.  
*How many chips did the boys eat?*  
*How many chips did the girls eat?*  
*Discuss strategies for adding the numbers together* (for example: combine the numbers that add to 'tidy' numbers; add the tens and then the ones; use doubles or near doubles).

#### **Session 4: Lollies**

1. Using a bag of mixed sweets to focus questions, the class brainstorms possible questions.  
*- Which is the least favourite lolly?*  
*- How many different kinds of lollies are there in the bag?*  
*- What colour lollies are there in the bag?*  
 Questions are recorded on strips of paper.
2. Groups of four select a question to be answered and place it on the desk with a sheet for recording tally marks. Students divide the tally sheet into categories.
3. Students move around the class recording choices under relevant categories.
4. When they have completed everyone's tally they return to their question.
5. Students use the tally chart to construct a bar chart.
6. Students prepare statements about the chart to share with the class.
7. Share charts as a class.
8. Model questions that they could ask and answer about the results.  
*How many students liked soft lollies?*  
*How many students liked wrapped lollies?*  
*How many students liked either yellow **or** green lollies?*

#### **Session 5.**

Today we plan our own investigation from a party prop display.

1. Use "party props" to generate discussion about parties.
2. Brainstorm possible questions to investigate. You may need to model possible questions as you display party props. For example:  
*Here are some balloons. Gosh I'm hopeless at blowing up balloons. It probably takes me 12 or more breaths to blow it up. How many breaths does it take you?*
3. In pairs students select a question to investigate and plan how they are going to collect the data. One idea is to use tally charts and to circulate asking their

classmates the survey question. This sounds chaotic but usually works very well and takes little more than five noisy minutes.

4. Once the data is collected the pairs need to display the data using either a pictograph or a bar chart. Ask them to write a couple of questions (to which they have worked out the answers) to accompany their graph.
5. Share survey results. Students can be challenged to answer the questions on each other's data displays.

Home Link:

I am planning to bake a cake to share with the children on the last day of our party maths unit. I want to bake the cake that is the most popular in all our families.

Please draw your favourite cake in one of the squares below and give it to your child to bring to school. As I can only bake certain cakes please choose to draw one of the following cakes:

- Chocolate cake
- Carrot cake
- Banana cake
- Sponge cake

My Favourite

[http://www.nzmaths.co.nz/resource/my-favourite?parent\\_node=](http://www.nzmaths.co.nz/resource/my-favourite?parent_node=)

## My Favourite

Purpose:

In this unit students collect data about favourites and present them in a variety of ways, starting with tally charts, and building up to using Microsoft Excel to create bar charts.

Achievement Objectives:

Achievement Objective: [Conduct investigations using the statistical enquiry cycle: posing and answering questions; gathering, sorting, and displaying category and whole-number data; communicating findings based on the data.](#)

Specific Learning Outcomes:

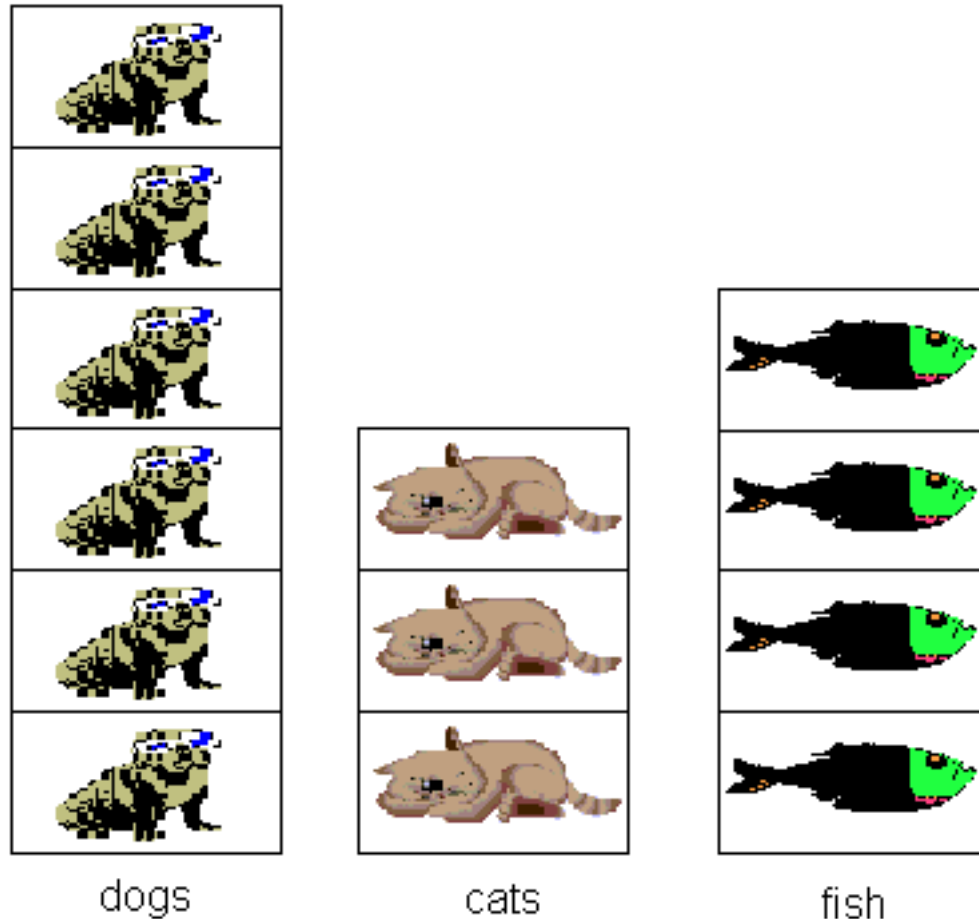
collect data on a tally chart; make pictograms to represent data; produce bar charts of data using Microsoft Excel;

Description of mathematics:

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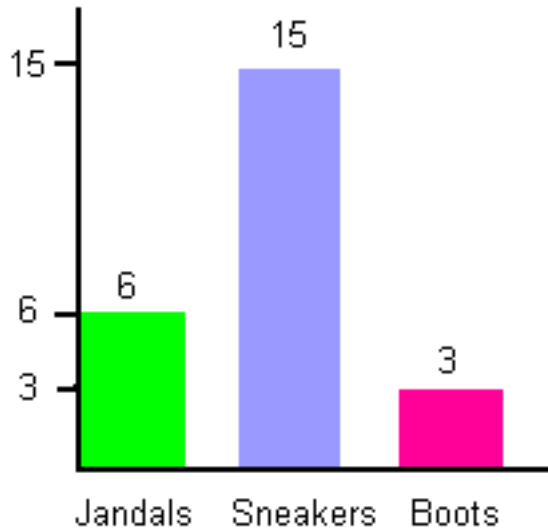


In a further development the pictures can be displayed on a chart with axes and titles. The vertical axis can be numbered to match the pictures.

## Bar Chart

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The example above shows the types of shoes worn in the class on a particular day. There are three types of shoes: jandals, sneakers, and boots. The height of the corresponding rectangles shows that there are 6 lots of jandals, 15 lots of sneakers and 3 boots.

#### Tally Chart

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Red cars	Yellow cars	White Cars	Black Cars	Other Colours

In the example above, in the time that we were recording cars, there were 11 red cars, 4 yellow cars, 18 white cars and 5 black ones and 22 cars of other colours. Microsoft Excel Microsoft Excel is a program available on most types of computers that allows data to be entered onto a spreadsheet and then analysed and graphed very easily. If you are unfamiliar with Excel there is information on using it [here](#).

#### Required Resource Materials:

Paper for tally charts

A4 paper cut into eighths for pictograms

Computers with Microsoft Excel (if you are unfamiliar with Microsoft Excel, information is given in the spreadsheet tutorial.)

Spreadsheet Tutorial (see Related Resources if needed)

Activity:

#### Session 1

1. Brainstorm with students things that they have a favourite of.  
*My favourite colour is blue, what are your favourite colours?* Get students to suggest others (eg. animal, food, day of the week, flavour of icecream, sport, song, school subject). Make a list of suggestions.
2. As a class select one of the suggestions to investigate, avoiding choosing colour as it will be used in session three.
3. Make a list of the possible responses trying to keep the number of possible answers to no more than about five or six. This may require some negotiation, for example, students will come up with more than six icecream flavours, so some may have to be disallowed, or joined with other flavours to create groups such as 'anything with chocolate'.
4. Get students to come up individually and put a mark beside the answer that is their favourite.
5. Once all students have made a mark, write the number beside each group of tally marks. Show how it would be easier to count the tally marks if they were grouped into fives. Explain that the usual way to do it is to draw vertical tally marks until there are four and then draw the fifth as a horizontal or diagonal line. Discuss what the chart shows. *What is the favourite, which is the least favourite etc.*

## Session 2

1. Select one of the suggestions from the list of class favourites, making sure it is one which could be drawn (eg. animal, food, sport)
2. Make a list of the possible answers, again keeping the number of different answers allowed to no more than five or six.
3. Hand out a piece of paper (one eighth of an A4) to each student.
4. Get them to draw their favourite on their piece of paper.
5. Ask the students for suggestions as to how the pictures could be displayed to show which is the favourite. If matching pictures in 1:1 lines (Pictogram) is not suggested, you will need to direct them to this.
6. Students attach their drawing to the class chart.
7. Discuss information shown on pictogram. These could be recorded as "speech bubbles" around the chart.
8. Talk about the need to give the chart a title so that others could make sense of the display. Write the title on the chart.

## Session 3

1. Tell the students that we will be making another pictogram like the previous lesson. Today we will be working on favourite colour.
2. Draw up a set of axes and label with favourite colours along the x-axis and draw in a grid to allow each student to colour in one box. Note that because this is discrete data (we count it rather than measuring it) we will make a bar graph, not a histogram, so there should be gaps between the bars.

red	blue	green	brown	yellow

3. Get students to come up one at a time and 'draw in' their favourite colour.
4. Talk about what it shows. Discuss how we could make it clearer, look for suggestions to add a title, and put numbers up the side.
5. Explain that this is a bar graph because we have bars to represent how many students chose each colour.

#### Session 4

1. Select another from the list of possible favourites.
2. Again ensure that there are no more than five or six answers allowable.
3. Survey the class, summarising the results on a tally chart, add in the results from the at home survey.
4. Explain that we are going to make a bar graph like in the previous session, but this time we are going to use the computer to help us.
5. Enter the results onto an Excel spreadsheet and save the data file.
6. Show the students how to use chart wizard to make a bar graph of the results.
7. Students could work in small groups to experiment with changing sizes, colours, fonts etc. to make their own bar graph of the data. Print the graphs for later discussion. (As most classes will not have sufficient computers for the groups to do this at the same time you may need to timetable turns throughout the day.)
8. Display and discuss the printed graphs. Point out important features;  
*Is it clear?*  
*Can you tell what it is about?*  
*Can you see all the information?*

#### Session 5

1. Students work in small groups to select another topic either from the class list, or an idea which they have had approved by the teacher to survey.
2. Groups to survey either the class or possibly other classes within the school, producing tally charts of their results.
3. Students may require some help from the teacher entering the data onto Excel spreadsheets.
4. Students produce bar graphs of data and are given time to adjust to their own preference.

5. Early finishers could write a commentary of what their graph tells them.
6. Time allowed to share completed graphs with the class.
7. Display work on wall.

Home Link:

**Dear Family,**

In mathematics this week we are doing a statistics study on favourites, could you help us by filling in the survey form your child has produced to get some data about favourite things?

Name:

Favourite					
Favourite					
Favourite					
Favourite					

Name:

Favourite					
Favourite					
Favourite					
Favourite					

Name:

Favourite					
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Name:

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## Planning a Statistical Investigation

[http://www.nzmaths.co.nz/resource/planning-statistics-investigation?parent\\_node=](http://www.nzmaths.co.nz/resource/planning-statistics-investigation?parent_node=)

# Planning a Statistics Investigation

### Purpose:

In this unit students will identify how to plan and carry out a statistical investigation, looking at facts about their class as a context.

### Achievement Objectives:

Achievement Objective: [Conduct investigations using the statistical enquiry cycle: posing and answering questions; gathering, sorting, and displaying category and whole-number data; communicating findings based on the data.](#)

### Specific Learning Outcomes:

write questions for statistical investigations and design a method of collection of data. display collected data in an appropriate format. make statements about implications or possible actions based on the results of an investigation. make conclusions on the basis of statistical investigations.

### Description of mathematics:

It is vital when planning statistical investigations that the students understand the importance of the way that they collect, record and present their information. If they are not consistent in the way they carry out any of these steps, they could alter their findings, therefore making their investigation invalid. In this unit the students will first look at choosing questions to investigate, making sure that the topic lends itself to being investigated statistically. They will then collect their data using tally charts. Once they have collected and recorded their data they will present their findings as bar graphs.

### Required Resource Materials:

Paper and pencils

Presentation materials

### Activity:

Although this unit is set out as five sessions, to cover the topic of statistical investigations in depth will likely take longer. Some of the sessions, especially Sessions 4 and 5 dealing with data presentation, could easily be extended as a unit in themselves. Alternatively, this unit could follow on from a unit on data presentation to give students an appreciation of practical applications of data display.

## Session 1

Session 1 provides an introduction to statistical investigations. The class will work together to create a bar chart of numbers of siblings for the class.

1. Explain to the class that their job for maths this week will be to gather statistics on the class to be presented as a report which will be sent home for parents.
2. Ask students whether they can explain what the word statistics means.
3. Explain that statistics are detailed information presented in a way that other people can easily understand what it shows.

4. Explain that the class will work in small groups, each of them with the job of finding information about a particular question.
5. First we will work as a whole class to answer the question:  
*How many brothers and sisters do people in our class have?*
6. Ask each student how many brothers and sisters they have and to record their answer on a piece of paper (without suggesting any organising structure).  
*Would the piece of paper would be a good way to show someone else how many brothers and sisters people in the class have?*  
*What would be a better way?*  
*How can we show the information so that people can easily understand what it is showing?*
7. Hopefully someone will suggest a more organised list, or counting the number of 0s, the number of 1s etc and writing sentences to explain how many there are of each.
8. Carry out these suggestions to show how much clearer they make the information.
9. Ask for suggestions for other ways to show the information.
10. If nobody suggests it introduce the idea of bar graphs.
11. Demonstrate how to draw a bar graph of the information, ensuring that you highlight important features of bar graphs; axes, scale and labels on the axes, title, and accurately plotted bars. Students could draw their own versions as a practice exercise.
12. Explain that over the next few days students will be investigating some other ideas about the class and making their own graphs to show the information.

## Session 2

This session is ultimately about choosing an appropriate topic to investigate. There will be a real need for discussion about measurable data and realistic topics that can be investigated in the given time frame. It would be a good idea to provide the students with a list of topics, but they should be encouraged to try and come up with something original where possible.

1. Recap the previous session's work, discussing how the information was collected and how it was presented.
2. Explain that in this session students will work in small groups to come up with three questions that they will collect information from the class about so that they can make graphs of it.
3. Write up a list of criteria that the questions must meet.
  - They must be appropriate to ask everyone.
  - They must be easy to answer.
  - There must be no more than 5 answers that people can give. (Any more would be too messy to graph).
1. Put students in to small groups and give them a few minutes to come up with some ideas that they think they might use.
2. If groups are having trouble thinking of ideas, you could try writing a list of suggestions on the board, but limiting groups to using one of your ideas only, to encourage them to think of their own. Some ideas could be:
  - Favourite flavour of icecream/pizza/softdrink etc.

- Favourite pet
- Colour of eyes
- Shoe size
- Favourite colour

1. Once groups have decided on their questions to ask, share them as a class, and ensure that they are all appropriate.
2. If groups need to change any of their questions, give them time to do so now.
3. Ensure that all groups record their questions for next session.

### Session 3

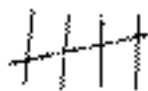
Data collection is a vital part of the investigation process. In this session students will collect data in tally charts for analysis in the following sessions.

1. Discuss with the class the best ways to collect the information from the class. Students may suggest asking the class and collecting the information in the same way as in Session 1. This will not be practical for the number of questions that need to be answered here.
2. Demonstrate how to draw a simple tally chart for others to answer questions on.

What is your favourite colour?

Blue	Red	Yellow	Green

1. Show students how to mark a tally chart, with four vertical strokes for the first four marks and then a diagonal line to complete five.



2. Have each group construct three tally charts that clearly show their questions and give columns for the possible answers to be recorded in.
3. Place each group's tally charts on a desk and have all groups rotate around the room until everyone has answered all the questions.
4. When groups are back at their own tally charts have them check that they can tell where all the tally marks have been drawn.
5. Have each group count the tallies in each category and write the number to save time in the next session.

### Session 4

In this session the students will work on creating bar graphs of the data collected in the previous session.

1. Show the graph created in Session 1 of numbers of siblings.
2. Discuss how it was made and what needs to be included on it.

3. Give students time to work on their first graph, providing support as required. Providing pre-drawn axes may be useful, but students may still need help selecting an appropriate scale to use on the y-axis.
4. After all students have completed one of their graphs bring the class together to share what students have done.
5. Discuss and compare graphs between groups.
6. Send students to work on the remainder of their graphs.

## Session 5

Session 5 is a finishing off session. Students should be given time to complete their graphs, and to write statements about what they show

1. Give groups time to finish graphs as required.
2. Students should also write statements under each graph telling what the graph shows. Starters for these statements could be given:
  - The most popular...
  - The least popular...
  - Most students in our class...
3. Students could compile their graphs as a booklet to take home to their families entitled "About our class" or similar. Alternatively, create a class display of the findings, or share them with another class.

Home Link:

## Dear Family,

During the next week we will be working on a maths unit looking at statistical investigations. Over this time, your child will be gathering data on the class and presenting it as graphs. If there are any graphs or tables of information suitable to discuss with your child available, either in the newspaper, or in a book, this week would be a good time to do so.

Data Squares Level 2

[http://www.nzmaths.co.nz/resource/data-squares-level-2?parent\\_node=](http://www.nzmaths.co.nz/resource/data-squares-level-2?parent_node=)

# Data Squares Level 2

Purpose:

This unit introduces the students to a way of looking at information from a group of individuals, i.e. a data set. "Data Squares" are used to display information about individuals. By sorting and organising a set of data squares students can find out things or answer questions about the group. Several pieces of information about individuals are on each data squares, allowing different categories to be looked at simply by rearranging the squares. Session One – What is a data square? Completing a data square about themselves Session Two - Organising and displaying a set of data squares to find out things and answer questions about a group of twelve students Session Three - Organising and displaying the class data squares to find out things about the class and check if statements suggested are correct Session Four - Designing and collecting their own data squares Session Five - Organising and displaying their own data squares to find out things and answer question and check if statements suggested are correct



Achievement Objectives:

Achievement Objective: [Conduct investigations using the statistical enquiry cycle: posing and answering questions; gathering, sorting, and displaying category and whole-number data; communicating findings based on the data.](#)

Specific Learning Outcomes:

\* write questions for investigation \* collect information sort information into categories display information to answer questions or find out things answer questions by sorting, organizing and arranging information make sensible statements about the information and be able to back up their statements with appropriate displays.

Description of mathematics:

This unit focuses on sorting and organising data sets, i.e. collections of information from a group of individuals. Looking at the data, sorting and organising it, is the first thing done. As the data set is looked at questions or interesting things arise, which is different than starting with a question then collecting data to see if it is correct. Understanding the difference between individual data and group data is central to the unit. The goal is to move students from “that is Jo’s data and that is me” to making statements about the group in general. Increasing student’s ability to accurately describe aspects of a data set, including developing statistical vocabulary, is part of the unit. As students become comfortable with making statements and describing data, more precise vocabulary is to be encouraged. The meaning and usage of words like; same, similar, exactly and almost need to be explored during the unit along with the importance of using numerical descriptions, e.g. 2 more than, when describing or comparing data. A “Data Square” is simply a square piece of paper containing information about an individual person or thing. At this level the data square is divided into three areas with the same category information in the same location on each square. In this unit the terms data and information are used to mean the same thing and are interchanged throughout.

Required Resource Materials:

paper and pencils

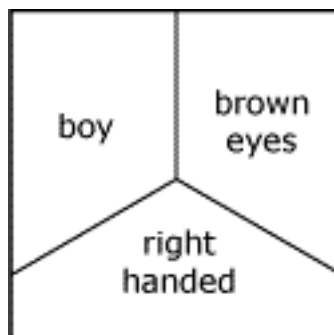
Copymaster 1 (226KB) Data Set One

Copymaster 2 (179KB) Blank Data Squares

Activity:

### Session One

Show the following data square to the class and explain what a data square is, i.e. a square piece of paper contains three pieces of information about one person.



Ask the class to tell you something about this student. Does anyone in the class fit this data square? Do you know someone that fits this data square that not in this class? How many different people could this data square be correct for?

Turn the data square over to reveal the name of someone that fits this data square the students will know. The point to get across is that a data square could fit many people but each data square is about one particular person.

Discuss the importance of knowing exactly what each piece of data is about. What could “right handed” mean? If the data square just said “brown”, instead of “brown eyes” what could it mean?

Explain to the students that the way to view each piece of data is to see it as the answer to a question. Get them to suggest the questions that give these three pieces of information. Discuss how some students could answer the same question differently, e.g. “Are you right handed or left handed?” could give two different answers for the person who throws a ball with one hand and writes with the other. A more specific question is needed, e.g. “What hand do you write with to produce your best looking work.”

What would a data square about you look like?

Hand out a data square to each student to fill out. Have each student write their name on the back of the data square hand back to the teacher.

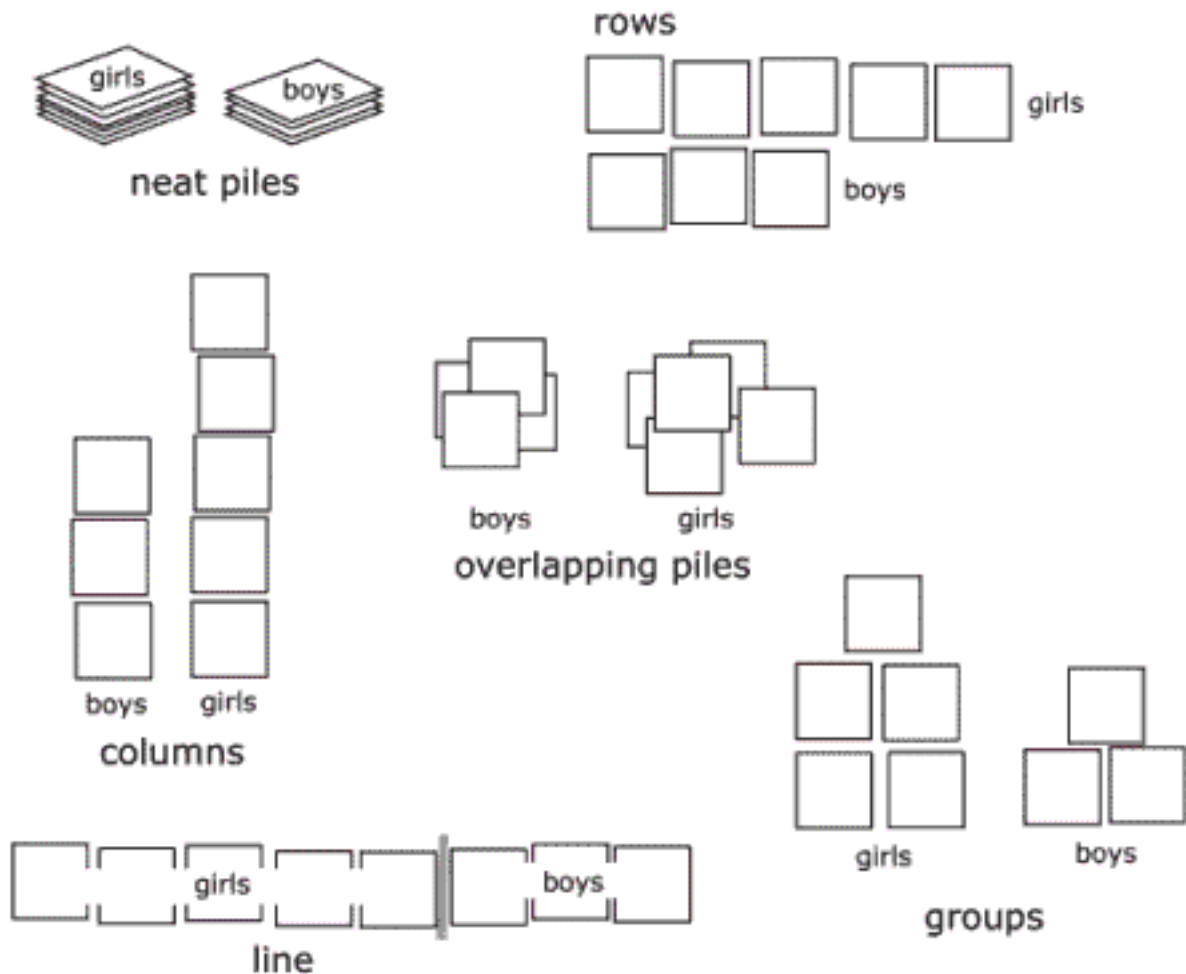
After this session the teacher needs to arrange the data squares onto pieces of paper and photocopy them. One set for each pair of students. Photocopying onto coloured paper is suggested to make it easy to recognise the class’s data set. This data set will be used during Session Three.

## **Session Two**

Start the session by reminding the students about the data square they filled in during Session One. Select a data square one of the class filled out and read out the three pieces of data and ask the questions, “Whose data square could this one be?”, “Could it be anyone else in the class?”, “Could it be someone else in the school?”, “Could it be a teacher or other adult?” Repeat this several times.

Organise the students into pairs and hand out to each pair a set of Data Set One, Copymaster. Tell them this is a group of students from another school and get them to cut out all the data squares. Once the data squares are cut out have the students sort and organise the data squares to find out things about this data set. Remind them we are interested in the group and not individual students.

At as suitable time as the pairs of students are organising the data squares to show something, have the class stop and look at the different ways the data squares have been arranged. Briefly discuss the different ways, along with writing up or drawing the different ways on to the board for all students to see. The question “What is good about this way?” or “When would it be good to organise the squares like this?” could be asked.



Ask the following questions and get each pair of students to organise the data squares into one of the above arrangements to show the answer.

1. Are there more boys than girls? Organise into columns
2. Which hand do most students in the class write with? Organise into rows
3. Is green the eye colour most students have? Organise into piles
4. Which hand do most girls write with? Arrange into groups, i.e. groups of groups

Have the students' suggest similar questions they could investigate then encourage them to look at the data squares, organising and reorganising to find out as much as they can about this group of students.

Initially encourage the students to look at one category at a time to answer "How many?" type questions. Once this is able to be done confidently, encourage students to look for categories within other categories, e.g. Do more girls write with their left hands or with their right hands?

Write on a large piece of paper what the class discovers or get each pair to write up what they find out about this group. Keep this information, as it can be used later to compare with other data sets.

### Session Three

Explain to the class that today they will be sorting and arranging data squares, like Session Two, except they will be using the data squares they wrote about themselves. Before the copied data squares are handed out discuss what the students expect to find out. “What do you think we will find out about our class?” “Will it be mainly different or similar to the group looked at in Session Two?”

Hand out the copied data squares from Session One to each pair of students. The pairs are to cut out the data squares, sort them and organise them to look for other interesting things about the class.

The teacher is to move around getting each pair getting them to explain and show what they have found out. The teacher is to encourage the pairs to add detail to their answers, moving students from “Yes there are more girls than boys” to “Yes there are 15 girls, 5 more girls than boys.”

Conclude the day by considering the statements the students made at the start of the day and seeing how many were true and discussing other interesting things found out about the class.

## Session Four

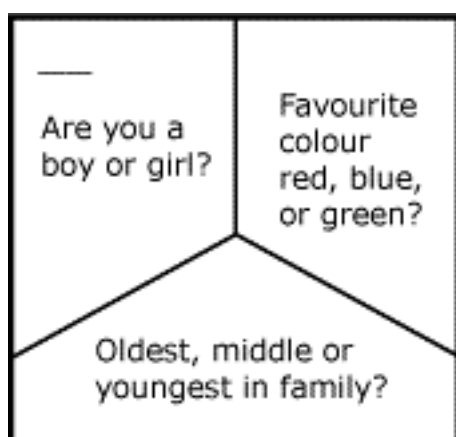
Today the students, in pairs, will design and collect their own data square set. Each pair of students needs to design two questions to ask 24 other students in the class. The first question will be “Are you a boy or a girl?” with two new questions added.

Discuss and brainstorm suitable questions. Questions need to be answered with either yes or no, or an option selected. Keep the optional answers to a maximum of three options.

Sample questions:

- Do you have a pet at home?
- Do you have an older brother?
- Can you swim one length of the school pool without touching the bottom?
- What is your favourite colour out of red, blue or green?
- Which television programme do you most like Simpsons or What Now?
- What present do you want for Christmas out of a book, a doll, a ball?

Once suitable questions have been developed they are to be written onto a large data square.



Before starting to collect data each pair of students needs to write three statements about what they expect to find out about the class. More able students are to be encouraged to write statements about categories within categories, e.g. “Most girls will select red as their favourite colour” or “About the

same number of boys as girls will be youngest in their family” or “The most common data square will be boy, blue and middle”.

Each pairs of students is to cut out 24 blank data squares and number them 1 to 24. Once completed the pair of students are to ask 12 students each their three questions and fill out a data square for each student. The student’s name needs to be written on the back to make sure 24 different students are selected.

The importance of keeping the data in the same position needs to be stressed, i.e. the answer to the question “Are you a boy or girl?” is always placed top right and the place in the family always at the bottom. This makes sorting and organising the data squares later much easier.

The use of abbreviation and initials could be introduced at this point if the teacher feels that class is ready for this.

## **Session Five**

In pairs the students are to sort and organise their 24 data squares to look for other interesting things about the class and to see if the statements they made about the class were correct.

After a set time each pair reports what they found out about the class. This could be in the form of a written report, a conference with the teacher or a presentation to the class.